MI FluFocus

Influenza Surveillance and Avian Influenza Update

Bureau of Epidemiology
Bureau of Laboratories

Michigan Department of Community Health
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New updates in this issue:

- **Michigan Surveillance:** Activity continues increasing; first Michigan pediatric death reported.
- **National Surveillance:** Activity increases; all viruses isolated in the past week were novel H1N1.
- **International Surveillance:** Hong Kong reports a Chinese patient with H9 influenza infection.

******2009 Influenza A (H1N1) virus Updates******

On August 17 and September 18, MDCH released guidance for healthcare providers, laboratorians and public health personnel regarding appropriate patients for influenza testing at the MDCH lab and reporting of influenza hospitalizations and deaths. The guidance is available at www.michigan.gov/h1n1flu.

Please continue to reference the State of Michigan's novel 2009 influenza A (H1N1) website at www.michigan.gov/h1n1flu and the MDCH influenza website at www.michigan.gov/flu for additional information. Local health departments can find guidance documents in the MI-HAN document library. In addition to the previous websites, additional laboratory-specific information is located at the Bureau of Laboratories H1N1 page at http://www.michigan.gov/mdch/0,1607,7-132-2945_5103-213906--,00.html.

International (WHO Pandemic H1N1 2009 update 72 [edited], October 30): As of 25 October 2009, worldwide there have been more than 440,000 laboratory confirmed cases of pandemic influenza H1N1 2009 and over 5700 deaths reported to WHO.

As many countries have stopped counting individual cases, particularly of milder illness, the case count is likely to be significantly lower than the actual number of cases that have occurred. WHO is actively monitoring the progress of the pandemic through frequent consultations with the WHO Regional Offices and member states and through monitoring of multiple sources of data.

In the temperate zone of the northern hemisphere, influenza transmission continues to intensify marking an unusually early start to winter influenza season in some countries. In North America, the US, and parts of Western Canada continue to report high rates of influenza-like-illness (ILI) and numbers of pandemic H1N1 2009 virus detections; Mexico has reported more confirmed cases since September than during the springtime epidemic. In Western Europe, high rates of ILI and proportions of respiratory specimens testing positive for pandemic H1N1 2009 have been observed in at least five countries: Iceland, Ireland, the UK (N. Ireland), Belgium, and the Netherlands. Many other countries in Europe and Western and Central Asia are showing evidence of early influenza transmission, including in Spain, Austria, parts of Northern Europe, Russia, and Turkey. In Japan, influenza activity has also increased sharply, especially on the northern island, approximately 10 weeks ahead the usual start of the winter influenza season.

Pandemic influenza transmission remains active in many parts of the tropical zone of the Americas, most notably in several Caribbean countries. Overall transmission continues to decline in most but not all parts of the tropical zone of South and Southeast Asia. Little influenza activity has been reported in temperate region of the southern hemisphere since the last update.

The countries and overseas territories/communities that have newly reported their first deaths among pandemic (H1N1) 2009 confirmed cases since the last web update (No 71): Russia, Jordan, Serbia, the Czech Republic, Turkey, Finland, Guadeloupe (FOC), and Moldova.

Region – Cumulative totals as of October 25, 2009		
	Cases*	Deaths
WHO Regional Office for Africa (AFRO)	13536	75
WHO Regional Office for the Americas (AMRO)	174565	4175
WHO Regional Office for the Eastern Mediterranean (EMRO)	17150	111
WHO Regional Office for Europe (EURO)	Over 64000	At least 281
WHO Regional Office for South-East Asia (SEARO)	42901	605
WHO Regional Office for the Western Pacific (WPRO)	129509	465
Total	Over 441661	At least 5712

*Given that countries are no longer required to test and report individual cases, the number of cases reported actually understates the real number of cases.

******Influenza Surveillance Reports******

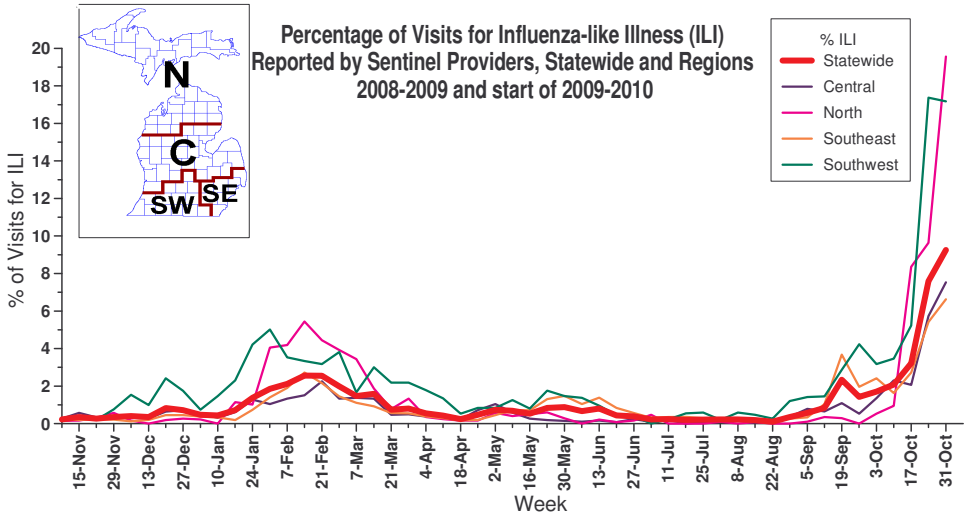
Michigan Disease Surveillance System: The week ending October 31 saw aggregate flu-like numbers near the previous week's levels, while individual influenza reports saw an increase. The novel H1N1 influenza reports saw a notable increase over the previous week's numbers. All numbers are notably higher than what was seen at this time last year.

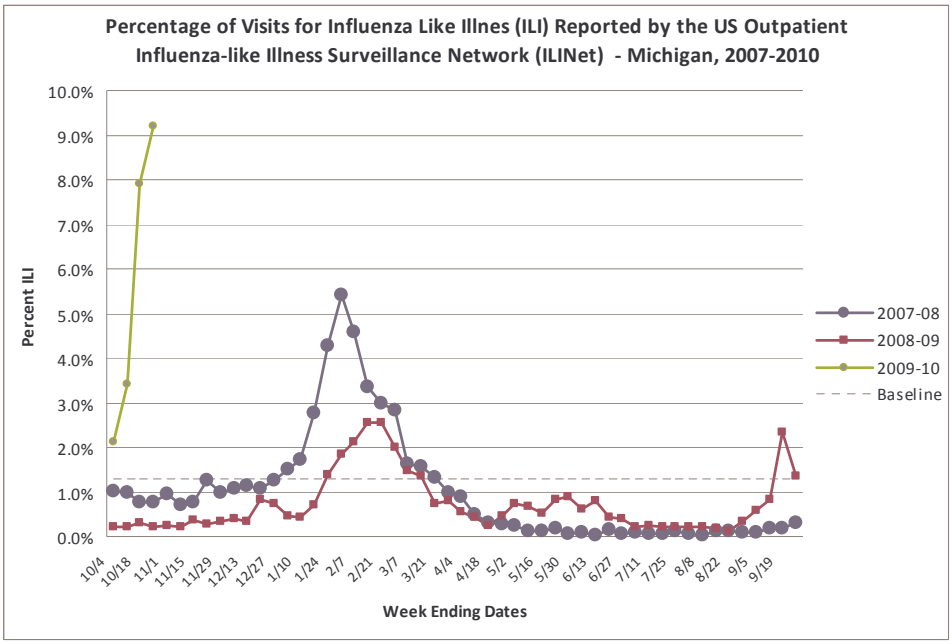
During the week of October 25-31, 2009, 46,272 cases of flu-like illness and confirmed and probable cases of seasonal and novel influenza were reported in Michigan. 195 hospitalizations and 10 deaths associated with influenza were also reported during this time. This report is updated every Tuesday by 5:00 pm and can be accessed at a link on this website: http://www.michigan.gov/h1n1flu.

Emergency Department Surveillance: Emergency department visits from both constitutional and respiratory complaints were slightly higher than last week's levels. Both constitutional and respiratory complaints are higher compared to what was seen this time last year. Seventeen constitutional alerts were generated in the C(8), SE(4), N(2), SW(2), and 1 statewide alert across the Influenza Surveillance Regions last week. Five respiratory alerts were generated in the C(2), N(2) and SE(1) Influenza Surveillance Regions last week.

Over-the-Counter Product Surveillance: Overall, OTC product sales were mixed. Children's electrolytes and thermometer sales decreased slightly compared to the previous week. The remaining indicators held steady near the previous weeks' sales numbers. All sales indicators, with the exception of thermometer sales, which are slightly higher, are comparable to levels seen at this time last year.

Sentinel Provider Surveillance (as of November 5, 2009): During the week ending October 31, 2009, the proportion of visits due to influenza-like illness (ILI) continued increasing to 9.2% overall; 1,326 patient visits due to ILI were reported out of 14,340 office visits. 38 sentinel sites provided data for this report. Activity increased in three surveillance regions: Central (7.5%); North (19.6%); and Southeast (6.6%) and slightly decreased in the Southwest (17.2%) region. One site from the North region reported 75% of patient visits due to ILI. Pediatrician offices reported a mean ILI of 13.2% and Student Health Centers reported a mean of 12.8%. Please note that these rates may change as additional reports are received.





As part of pandemic influenza surveillance, CDC and MDCH highly encourage year-round participation from all sentinel providers. New practices are encouraged to join the sentinel surveillance program today! Contact Cristi Carlton at 517-335-9104 or CarltonC2@michigan.gov for more information.

Laboratory Surveillance (as of October 31): During the week of October 25-31, MDCH Bureau of Laboratories identified 78 novel H1N1 and 4 influenza A (unsubtypeable) influenza isolates. For the 2009-2010 season (starting on October 4, 2009), MDCH BOL has identified 348 influenza isolates:

- Novel Influenza A (H1N1): 342
- Influenza A unsubtypeable: 5
- Influenza B: 1

17 sentinel labs reported for the week ending October 31, 2009. 4 labs reported rapidly increasing influenza A positives (SE, SW), 8 labs reported moderately elevated or sustained increases in A positives (SE, SW, C, N), 3 labs had low sustained levels of A positives (SE, N), and 2 labs reported decreasing or sporadic A positives (N). No labs reported any influenza B positives.

Michigan Influenza Antigenic Characterization (as of November 5): CDC antigenic characterization results are currently not available for any 2009-10 season specimens.

Michigan Influenza Antiviral Resistance Data (as of November 5): Results are currently not available for antiviral resistance at CDC for the 2009-2010 season.

Antiviral resistance testing takes months to complete and cannot be used to guide individual patient treatment. However, CDC has made recommendations regarding the use of antivirals for treatment and prophylaxis of influenza. The guidance is available at http://www.cdc.gov/H1N1flu/recommendations.htm.

Seasonal Influenza-Associated Pediatric Mortality (as of November 5): One influenza-associated pediatric mortality (N) due to novel H1N1 influenza has been reported to MDCH for the 2009-2010 influenza season.

***CDC has asked states for information on any pediatric death associated with influenza. This includes not only any pediatric death (<18 years) resulting from a compatible illness with laboratory confirmation of influenza, but also any unexplained pediatric death with evidence of an infectious process. Please immediately call MDCH to ensure proper specimens are obtained. View the complete MDCH protocol online at http://www.michigan.gov/documents/mdch/ME_pediatric_influenza_guidance_v2_214270_7.pdf.

Influenza Congregate Settings Outbreaks (as of November 5): Five congregate setting outbreaks with confirmatory novel influenza A H1N1 testing (3 SW, 1C, 1N), and two outbreaks associated with positive influenza A tests (1C, 1N) have been reported to MDCH for the 2009-2010 influenza season. These are all school facilities.

As of 9:00am on November 6, 541 influenza-related school and/or district closures in Michigan (Public Health Preparedness Region 1 - 52, Region 2N - 3, Region 2S – 7, Region 3 - 46, Region 5 - 152, Region 6 - 97, Region 7 - 105, Region 8 - 79) have been reported.

National (CDC [edited], October 30): During week 42 (October 18-24, 2009), influenza activity increased in the U.S. 8,268 (42.1%) specimens tested by U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories and reported to CDC/Influenza Division were positive for influenza. All subtyped influenza A viruses being reported to CDC were 2009 influenza A (H1N1) viruses. The proportion of deaths attributed to pneumonia and influenza (P&I) was above the epidemic threshold. Twenty-two influenza-associated pediatric deaths were reported. Nineteen of these deaths were associated with 2009 influenza A (H1N1) virus infection and three were associated with an influenza A virus for which the subtype was undetermined. The proportion of outpatient visits for influenza-like illness (ILI) was above the national baseline. All 10 regions reported ILI above region-specific baseline levels. Forty-eight states reported geographically widespread influenza activity, Guam and two states reported regional influenza activity, the District of Columbia and Puerto Rico reported local influenza activity, and the U.S. Virgin Islands did not report.

Antiviral Resistance Testing Results on Samples Collected Since September 1, 2009.

	Samples tested (n)	Resistant Viruses, Number (%)	Samples tested (n)	Resistant Viruses, Number (%)	Samples tested (n)	Resistant Viruses, Number (%)
		Oseltamivir		Zanamivir		Adamantanes
Seasonal Influenza A (H1N1)	0	0 (0)	0	0 (0)	0	0 (0)
Influenza A (H3N2)	0	0 (0)	0	0 (0)	0	0 (0)
Influenza B	0	0 (0)	0	0 (0)	N/A*	N/A*
2009 Influenza A (H1N1)	730	3†‡ (0.5)	166	0 (0)	58	58 (100)

*The adamantanes (amantadine and rimantadine) are not effective against influenza B viruses.
†Two screening tools were used to determine oseltamivir resistance: sequence analysis of viral genes or a neuraminidase inhibition assay.
‡Additional laboratories perform antiviral resistance testing and report their results to CDC. Two additional oseltamivir resistant 2009 influenza A (H1N1) viruses have been identified by these laboratories since September 1, 2009, bringing the total number to 5.

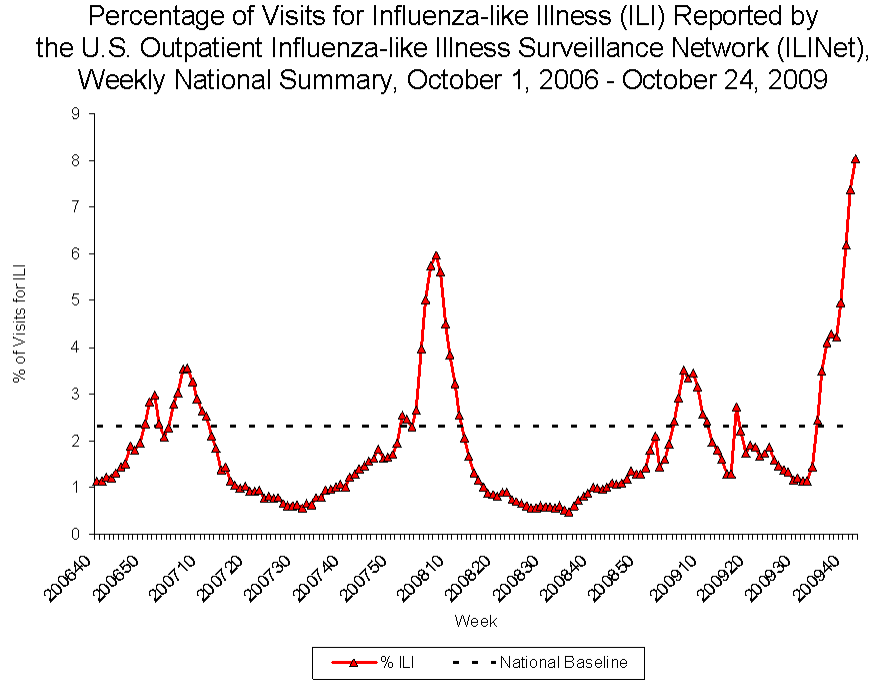
To access the entire CDC weekly surveillance report, visit http://www.cdc.gov/flu/weekly/fluactivity.htm

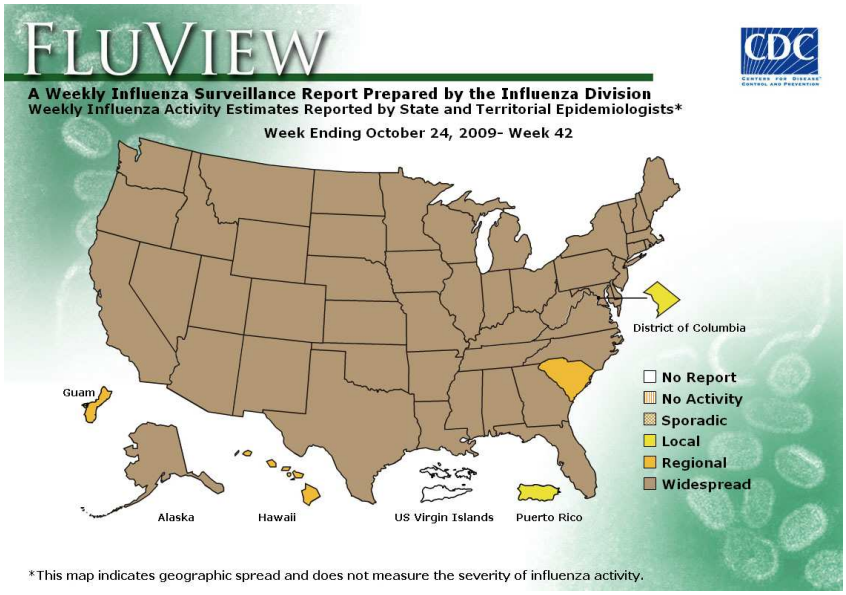
From http://www.cdc.gov/h1n1flu/updates/us/#totalcases:

U.S. Influenza and Pneumonia-Associated Hospitalizations and Deaths from Aug 30 – October 24, 2009

Cases Defined by	Hospitalizations	Deaths
Influenza and Pneumonia Syndrome*	25,985	2,916
Influenza Laboratory-Tests**	12,466	530

*Reports can be based on syndromic, admission or discharge data, or a combination of data elements that could include laboratory-confirmed and influenza-like illness hospitalizations.
**Laboratory confirmation includes any positive influenza test (rapid influenza tests, RT-PCR, DFA, IFA, or culture), whether or not typing was done.





International (WHO, October 19): During the weeks 38-39, the pandemic influenza A (H1N1) virus continued to be the predominant circulating strain of influenza in most of the countries with influenza activity.

Widespread outbreaks of pandemic influenza A (H1N1) were reported in the some parts of North America, Europe and Asia. The United States of America and China Hong Kong Special Administrative Region reported widespread pandemic influenza A (H1N1) activity together with low levels of H1, H3 and B viruses. Israel had widespread pandemic influenza A (H1N1) activity while China reported regional outbreaks of pandemic influenza A (H1N1) with cocirculation of H3, H1 and B. Japan and Spain also reported regional outbreaks of pandemic influenza A (H1N1). Belgium, Canada and Ireland reported increasing pandemic influenza A (H1N1) activity while local outbreaks were reported by the Netherlands and Slovenia. In parts of India, Bangladesh and Cambodia, pandemic influenza A (H1N1) transmission continued to be active. In Central America, Mexico, Cuba, Jamaica, Bahamas, Dominica, Saint Lucia, Costa Rica, Nicaragua, Panama and El Salvador reported outbreaks of pandemic influenza A (H1N1). Pandemic influenza transmission in the southern hemisphere continued to decrease or had returned to baseline.

Sporadic pandemic influenza A (H1N1) 2009 activity was reported in Argentina, Chile, Denmark, France, France - French Guiana, France - Guadeloupe, France - New Caledonia, Greece, Iran (Islamic Republic of), Italy, Kenya, Latvia, Netherlands, New Zealand, Norway, Poland, Romania, Russian Federation, Slovenia, South Africa and Ukraine.

The level of seasonal influenza activity in most countries was low with only sporadic detections except in China where outbreaks of H3 were reported as well as low levels of H1 and B. Sporadic seasonal influenza activity was observed in Australia (H1), Côte d'Ivoire (H3,B), Denmark (H3), France - French Guiana (H1), France - Guadeloupe (H3), Kenya (H1,H3,B), Lithuania (H1), Madagascar (B), Morocco (H1,H3), Norway (B), Russian Federation (H1,H3,B) and South Africa (H3,B).

Austria, Bulgaria, Cameroon, Estonia, France - Saint Barthélemy, France - Saint Martin, Georgia, Kyrgyzstan, Serbia, Slovakia, Sudan, Switzerland, Tunisia and Uzbekistan reported no influenza activity.

MDCH reported **WIDESPREAD INFLUENZA ACTIVITY** to the CDC for the week ending Oct. 31, 2009.

For those interested in additional influenza vaccination and education information, the MDCH *FluBytes* is available at http://www.michigan.gov/mdch/0,1607,7-132-2940_2955_22779_40563-125027--,00.html.

Avian and Novel Influenza Activity

WHO Pandemic Phase: Phase 6 – characterized by increased and sustained transmission in the general population. Human to human transmission of an animal or human-animal influenza reassortant virus has caused sustained community level outbreaks in at least two WHO regions.

National, Research (National Institutes of Health [edited], October 29): Influenza viruses evade infection-fighting antibodies by constantly changing the shape of their major surface protein. This shape-shifting, called antigenic drift, is why influenza vaccines-which are designed to elicit antibodies matched to each year's circulating virus strains-must be reformulated annually. Now, researchers from the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, have proposed a new explanation for the evolutionary forces that drive antigenic drift. The findings in mice, using a strain of seasonal influenza virus first isolated in 1934, also suggest that antigenic drift might be slowed by increasing the number of children vaccinated against influenza.

Scott Hensley, Ph.D., Jonathan W. Yewdell, M.D., Ph.D., and Jack R. Bennink, Ph.D., led the research team, whose findings appear in the current issue of Science.

"This research elegantly combines modern genetic techniques with decades-old approaches to give us new insights into the mechanisms of antigenic drift and how influenza viruses elude the immune system," says NIAID Director Anthony S. Fauci, M.D.

"No one is sure exactly how the antigenic drift of flu viruses happens in people," says Dr. Yewdell. According to the prevailing theory, drift occurs as the virus is passed from person to person and is exposed to differing antibody attacks at each stop. With varying success, antibodies recognize one or more of the four antigenic regions in hemagglutinin, the major outer coat protein of the flu virus. Antibodies in person A, for example, may mount an attack in which antibodies focus on a single antigenic region. Mutant viruses that arise in person A can escape antibodies by replacing one critical amino acid in this antigen region. These mutant viruses survive, multiply and are passed to person B, where the process is repeated.

It is not possible to dissect the mechanism of antigenic drift in people directly, notes Dr. Yewdell. So he and his colleagues turned to a classic mouse model system developed in the mid-1950s at the University of Chicago, but used rarely since. The team infected mice with a strain of seasonal influenza virus that had circulated in Puerto Rico in 1934. Some mice were first vaccinated against this virus strain and developed antibodies against it, while others were unvaccinated.

After infecting the vaccinated and unvaccinated mice with the 1934 influenza strain, the scientists isolated virus from the lungs of both sets of mice and passed on these viruses to a new set of mice. They did this nine times. After the final passage, the researchers sequenced the gene encoding the virus hemagglutinin protein. Of course, says Dr. Yewdell, gene sequencing was not possible in the mid-1950s, when the nature of the gene was first elucidated, and until very recently, sequencing was expensive and time-consuming. "Now, with automated gene sequencers, sequencing of dozens of isolates is easily done overnight," he says.

Sequencing revealed that the unvaccinated mice -- which lacked vaccine-induced antibodies -- had no mutated influenza viruses in their lungs. In contrast, the hemagglutinin gene in virus isolated from vaccinated mice had mutated in a way that increased the ability of the virus to adhere to the receptors it uses to enter lung cells. Essentially, says Dr. Yewdell, the virus can shield its hemagglutinin antigenic sites from antibody attack by binding more tightly to its receptor.

"The virus must strike the right balance, however," Dr. Yewdell says. "Excessively sticky viruses may end up binding to cells lining the nose or throat or to blood cells and may not make it into lung cells. Also, newly formed viruses must detach from infected cells before they can spread to the next uninfected cell. Viruses that have mutated to be highly adherent to the lung cell receptors may have difficulty completing this critical step in the infection cycle."

Next, the researchers infected a new set of unvaccinated mice with the high-affinity mutant virus strain that had emerged in the first series of experiments. In the absence of antibody pressure, the virus reverted to a low-affinity form and was once again able to easily infect cells and spread.

"We propose a model for antigenic drift in which high- and low-affinity influenza virus mutants alternate," says Dr. Yewdell. In adults -- who have been exposed to many strains of influenza in their lifetime and, correspondingly, have a wide range of antibody responses -- the virus is pressured to increase its receptor affinity to escape antibody neutralization. When such high-affinity mutants are passed to people -

- such as children -- who have not been exposed to many influenza strains or who have not been vaccinated against flu, receptor affinity decreases. People who have not been exposed to multiple influenza virus strains or who have never been vaccinated against influenza are said to be immunologically naïve.

"Our model predicts that decreasing the immunologically naïve population-by increasing the number of children vaccinated against influenza, for example-could slow the rate of antigenic drift and extend the duration of effectiveness of seasonal influenza vaccines," he says.

National, Ferret (KHAS-TV [edited], October 29): Several Nebraskans have died from complications of the H1N1 Virus. Countless others have gotten sick. Now we are hearing from one Hastings family who said their pets have gotten sick. One of them has died.

Four members of the DeVoll family came down with the flu three weeks ago. They are recovering. The outcome was not so good for their pet ferret.

The family has 4 ferrets. All the animals became sick with H1N1 when family members did.

Ferrets have the same respiratory system as humans. That allows them to get the virus. Birds and pigs can get it as well.

The DeVoll family said they had no idea their ferrets were at risk. "It was definitely a shock it was unexpected. I just never thought that Stormy would die from the H1N1," said Kristine DeVoll.

The state public health veterinarian said it is not unexpected, but it is rare. Only 2 ferrets in the nation have died from H1N1. That includes Stormy.

"The respiratory system of ferrets and people are quite similar and they are used as a laboratory model for influenza virus research in humans," said Dr. Annette Bredthauer.

Testing was done by the University of Nebraska Veterinary Diagnostic Lab where the ferret tested positive for H1N1. Now a sample has been forwarded on to the National Lab in Ames, Iowa for confirmation.

Dr. Bredthauer went on to say the H1N1 virus does not affect dogs and cats. So those pets are safe.

National, Swine (Indiana Board of Animal Health, November 2): Indiana State Veterinarian Bret D. Marsh, DVM, today issued the following statement on the U.S. Department of Agriculture's laboratory confirmation of the novel H1N1 virus in an Indiana swine herd.

"We need to remember that identifying a flu virus in a swine herd is not uncommon. Like humans, hogs are susceptible to many strains of flu.

The animals on the positive farm have already recovered from the illness. The herd is under the care of a private veterinary practitioner, who will verify all animals are healthy before being moved from the site. Under a herd health monitoring agreement a quarantine is not necessary.

People cannot contract H1N1 from consuming pork or pork products. The U.S. meat inspection system provides an additional safeguard by inspecting all animals presented for slaughter twice: once before and once after slaughter. Sick animals are rejected from the food chain.

The herd owner has indicated that workers who had contact with the animals had a history of influenza-like illness in the days preceding the herd's diagnosis. Laboratory testing confirmed the presence of the novel pandemic strain of H1N1. The herd owner followed a policy of sending ill workers home to avoid human and animal contact. State public health officials have been notified.

We commend the efforts of the herd owner, who made every effort to follow established guidelines for handling this situation, including minimizing human contact and reporting clinical signs to his herd veterinarian."

Information about the H1N1 virus, food safety and biosecurity information for pork producers is available online at: www.boah.in.gov .

National, Feline (American Veterinary Medical Association [edited], November 4): A cat in Iowa has tested positive for the 2009 H1N1 influenza virus, state officials confirmed this morning, marking the first time a cat has been diagnosed with this strain of influenza. The cat, which is recovering, is believed to have caught the virus from someone in the household who was sick with H1N1. There are no indications that the cat passed the virus on to any other animals or people.

Prior to this diagnosis, the 2009 H1N1 influenza virus had been found in humans, pigs, birds and ferrets.

The American Veterinary Medical Association (AVMA) and the American Association of Feline Practitioners (AAFP) are reminding pet owners that some viruses can pass between people and animals, so this was not an altogether unexpected event. Pet owners should monitor their pets' health very closely, no matter what type of animal, and visit a veterinarian if there are any signs of illness.

The AVMA is actively tracking all instances of H1N1 in animals and posting updates on our Web site at www.avma.org/public_health/influenza/new_virus.

International, Human (Hong Kong Information Service Department [edited], November 3): The Centre for Health Protection is investigating an imported case of H9 influenza A infection involving a 47 year old Guangdong woman. She came down with breathlessness and a cough 26 Oct 2009. She came to Hong Kong for medical treatment and was admitted to Queen Mary Hospital on 28 Oct 2009. She is stable and remains in isolation. She had an underlying medical condition requiring regular medication.

Her family members have been put under medical surveillance. As she was in Guangdong during the incubation period, the centre has informed health authorities there and the World Health Organization, the Ministry of Health, and Macau's health authorities of the development.

H9 influenza A is a mild form of avian influenza. Infection in humans is rare. This is the 6th time H9 viruses have been found in humans in Hong Kong. A total of 4 girls and one boy were confirmed to have suffered from H9 infection in 1999, 2003, 2007 and 2008.

People should avoid contact with live poultry to minimize the chance of being infected with avian flu.

International, Avian (Xinhua News Agency [edited], November 2): Bird flu has re-emerged in the northern province of Dien Bien in Viet Nam, according to a report from the Animal Health Department under Viet Nam's Ministry of Agriculture and Rural Development on Monday [2 Nov 2009]. The bird flu broke out in 9 local farms from 21 to 23 Oct 2009, killing hundreds of poultry, said the report. Poultry samples tested by the provincial animal health agency showed positive for the H5N1 virus, it said.

Local animal health authorities have been implementing measures to curb the spread of the bird flu virus to nearby areas, including the culling of over 2200 remaining poultry, said the department.

Dien Bien currently is the only province of Viet Nam being re-hit by the avian flu after it was confirmed of being free of the H5N1 virus for several months this year [2009].

Viet Nam has reported 5 human cases of bird flu infection so far this year [2009], 4 of which were fatal.

Michigan Wild Bird Surveillance (USDA, as of November 5): For the 2009 testing season (April 1, 2009-March 31, 2010), HPAI subtype H5N1 has not been recovered from any of the 62 Michigan samples tested to date, including 36 live wild birds, 16 hunter-killed birds and 10 morbidity/mortality specimens. H5N1 HPAI has not been recovered from 13,102 samples tested nationwide for the 2009 season. For more information, visit the National HPAI Early Detection Data System at http://wildlifedisease.nbii.gov/ai/.

To learn about avian influenza surveillance in Michigan wild birds or to report dead waterfowl, go to Michigan's Emerging Disease website at http://www.michigan.gov/emergingdiseases.

Please contact Susan Peters at PetersS1@Michigan.gov with any questions regarding this newsletter or to be added to the weekly electronic mailing list.

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Table 1. H5N1 Influenza in Poultry (Outbreaks up to September 20, 2009)

(Source: http://www.oie.int/downld/AVIAN%20INFLUENZA/A_AI-Asia.htm Downloaded 9/22/09)

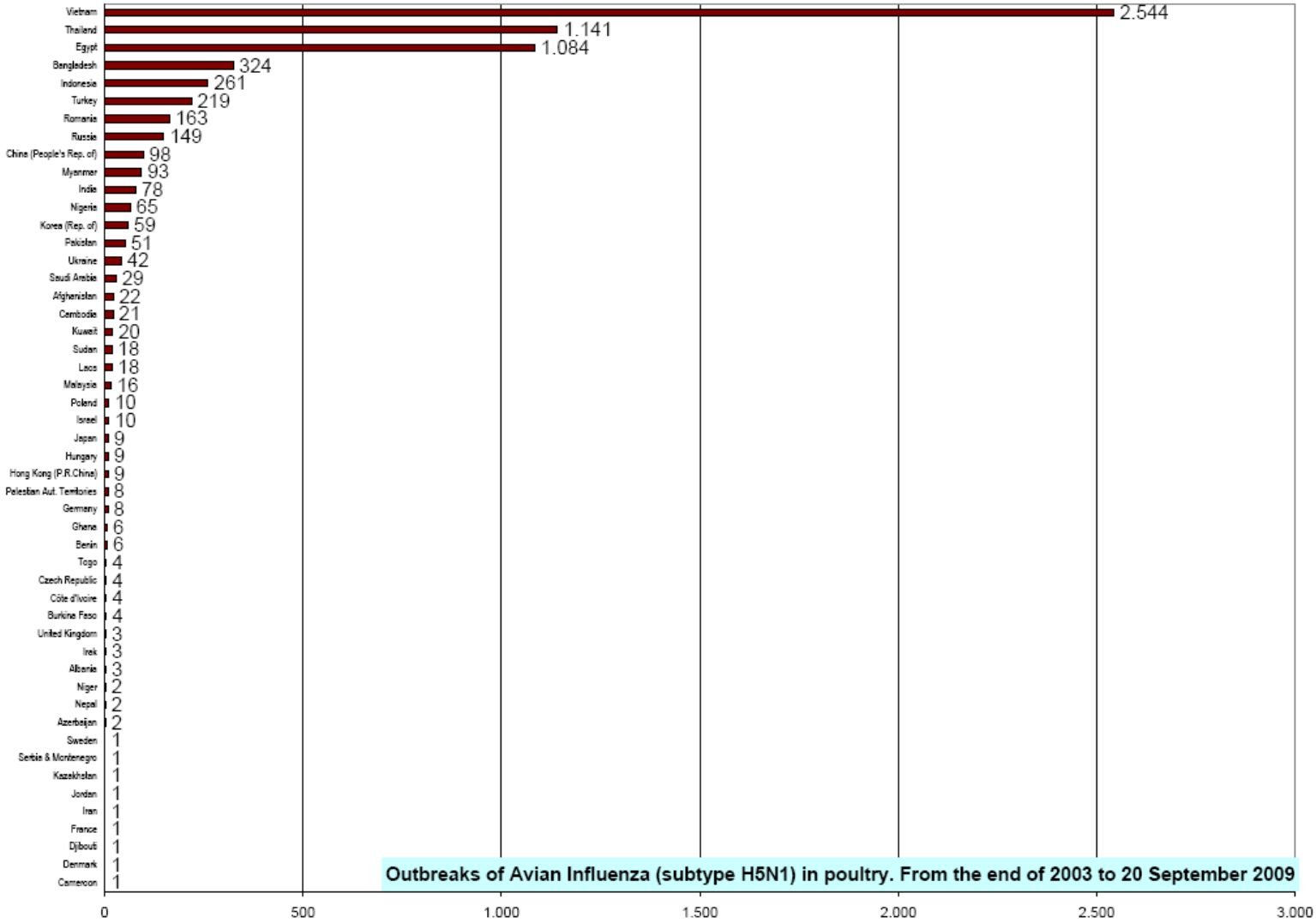

Table 2. H5N1 Influenza in Humans (Cases up to September 24, 2009)

(http://www.who.int/csr/disease/avian_influenza/country/cases_table_2009_09_24/en/index.html Downloaded 9/24/2009)

Cumulative number of lab-confirmed human cases reported to WHO. Total number of cases includes deaths.

Country	2003		2004		2005		2006		2007		2008		2009		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Azerbaijan	0	0	0	0	0	0	8	5	0	0	0	0	0	0	8	5
Bangladesh	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Cambodia	0	0	0	0	4	4	2	2	1	1	1	0	0	0	8	7
China	1	1	0	0	8	5	13	8	5	3	4	4	7	4	38	25
Djibouti	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Egypt	0	0	0	0	0	0	18	10	25	9	8	4	36	4	87	27
Indonesia	0	0	0	0	20	13	55	45	42	37	24	20	0	0	141	115
Iraq	0	0	0	0	0	0	3	2	0	0	0	0	0	0	3	2
Lao People's Democratic Republic	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2	2
Myanmar	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Nigeria	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1
Pakistan	0	0	0	0	0	0	0	0	3	1	0	0	0	0	3	1
Thailand	0	0	17	12	5	2	3	3	0	0	0	0	0	0	25	17
Turkey	0	0	0	0	0	0	12	4	0	0	0	0	0	0	12	4
Viet Nam	3	3	29	20	61	19	0	0	8	5	6	5	4	4	111	56
Total	4	4	46	32	98	43	115	79	88	59	44	33	47	12	442	262